I/ We claim:

1. A rotor and shaft for an asynchronous electrical motor, the rotor and shaft comprising:

a single piece of core material defining about a main axis a coaxially aligned and integrally formed rotor portion and shaft portion, the rotor portion having an outer cylindrical surface extending between a first and second ends of the rotor portion, the outer cylindrical surface of the rotor portion having a larger diameter than the shaft portion and the shaft portion includes a respective first and a second shaft ends extending from the first and second ends of the rotor portion; and

wherein a plurality of evenly separated parallel elongate passages are formed adjacent but spaced from the outer cylindrical surface of the rotor portion and parallel spaced about the main axis.

2. The rotor and shaft for an asynchronous electrical motor as set forth in claim 1 further comprising a plurality of conductor bars, each of said conductor bars being inserted within the respective elongate passage to define a squirrel cage type motor rotor and shaft.

3. The rotor and shaft for an asynchronous electrical motor as set forth in claim 2 wherein the asynchronous electrical motor is an induction motor.

4. The rotor and shaft for an asynchronous electrical motor as set forth in claim 3 wherein the single piece of core material is a magnetic material selected from the group of iron and steel.

5. The rotor and shaft for an asynchronous electrical motor as set forth in claim 4 further comprising a slot communicating between the spaced apart conductor bar passage and the cylindrical surface of the rotor portion, the slot running the length of the conductor bar passage from the first end to the second end of the rotor portion.

6. A method of forming a rotor and shaft for an asynchronous electrical motor, the method comprising the steps of:

machining from a single piece of core material a coaxially aligned and integrally formed rotor portion and shaft portion, the rotor portion defined about a

main axis having an outer cylindrical surface extending between a first and second ends of the rotor portion, the outer cylindrical surface of the rotor portion having a larger diameter than the shaft portion and the shaft portion includes a respective first and a second shaft ends extending from the first and second ends of the rotor portion; and

forming a plurality of evenly separated parallel elongate passages adjacent but spaced from the outer cylindrical surface of the rotor portion and parallel spaced about the main axis.

7. The method of forming a rotor and shaft for an asynchronous electrical motor as set forth in claim 6 further comprising the step of inserting a respective conductor bar within a respective elongate passage to define a squirrel cage type motor rotor.

8. The method of forming a rotor and shaft for an asynchronous electrical motor as set forth in claim 7 further comprising the step of choosing the single piece of core material as a magnetic material selected from the group of iron and steel.

9. The method of forming a rotor and shaft for an asynchronous electrical motor as set forth in claim 7 further comprising the step of machining a slot communicating between the spaced apart conductor bar passage and the cylindrical surface of the rotor portion, the slot running the length of the conductor bar passage from the first end to the second end of the rotor portion.

10. The method of forming a single piece rotor shaft device for an asynchronous induction type electric motor as set forth in claim 9, the method further comprising the step of affixing the at least one longitudinal conductor bar in the at least one longitudinal conductor bar slot by one of brazing, soldering and welding.

11. The method of forming a single piece rotor shaft device for an asynchronous induction type electric motor as set forth in claim 10, the method further comprising the step of providing a plurality of conductor bars and not directly connecting the conductor bars with one another by end rings.

12. An electric induction motor comprising:

a first and second relatively movable portions, the first portion supporting a primary winding and the second portion supporting a secondary winding;

an air gap separating the first and second relatively movable portions;

bearing supports for rotatably supporting the second portion and second winding adjacent the first portion and primary winding;

the second portion being a unitary piece of magnetic material defining about a main axis a coaxially aligned and integrally formed rotor portion and shaft portion, the shaft portion being supported by the bearing supports and the rotor portion having an outer cylindrical surface extending between a first and second ends of the rotor portion, the outer cylindrical surface of the rotor portion having a larger diameter than the shaft portion and extending radially adjacent to but separated by the air gap from the second portion; and

wherein the second winding is formed by a plurality of separate conductor bars affixed in a respective plurality of evenly separated parallel elongate passages formed within the rotor portion adjacent but spaced from the outer cylindrical surface of the rotor portion and parallel spaced about the main axis.

13. The electric induction motor as set forth in claim 12, wherein the single piece of core material is a magnetic material selected from the group of iron and steel.

14. The electric induction motor as set forth in claim 13 further comprising a slot communicating between the spaced apart conductor bar passage and the cylindrical surface of the rotor portion, the slot running the length of the conductor bar passage from the first end to the second end of the rotor portion.

15. The electric induction motor as set forth in claim 14, wherein the motor is a high speed motor having a frequency of at least 30,000 rpm.

16. The electric induction motor as set forth in claim 13, wherein a centrifugal velocity of the rotor is evaluated in units of surface feet/minute, s.f.m., which is related to the motor speed, rpm and the diameter D of the rotor by the relationship;

$$\text{s.f.m.} = (\Pi D/12) \times \text{r.p.m.}; \text{ and}$$

wherein the electric induction motor is provided with a rotor capable of operating with a centrifugal velocity of at least as great as 30,000 s.f.m. and more particularly is capable of operating at a centrifugal velocity of about 40,000 s.f.m.